AM-5® SERIES II ACOUSTIMASS® SPEAKER SYSTEM

SPECIFICATIONS

Transducers:	2-5.25" Low frequency drivers 4-2.25" Magnetically shielded midrange drivers
Nominal Impedance:	6 Ohms
Power Requirements:	10 Watts minimum / 200 Watts maximum
Dimensions:	
(Acoustimass Module)	19.1H x 35.5W x 48.9D cm
(Satellite Speakers)	16.2H x 7.9W x 12.1D cm
Finish:	
(Acoustimass Module)	Scratch resistant Satin finish, color Black or White
(Satellite Speakers)	Black or White polymer finish
Weight:	
(Acoustimass Module)	17.5 lbs
(Satellite Speakers)	1.95 lbs each

Rev 02 to Rev 03; add replacement woofer part number

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Service Manual

P/N 144375 REV.03

PROPRIETARY INFORMATION

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DISASSEMBLY/ASSEMBLY PROCEDURES

Acoustimass® Module Box (Per Figures 5 or 6)

Note: When removing the terminal cap panel **(9)** to perform the following repair procedures on the Acoustimass module, the service loop in the woofer wires should be unwound for greater access to the internal components. When repairs have been completed, the wires should be reformed into a service loop.

1. Terminal Cap Panel Removal: Remove the six screws **(10)** that hold the terminal cap panel **(9)** in place. Next, starting at any corner, pry the panel slightly open and continue with each corner until it is completely separated from the enclosure.

2. Terminal Cap Panel Replacement:

2.1 Before replacing the terminal cap panel **(9)**, make sure the wires used to connect the woofers **(4)** to the crossover assembly **(7)** have an adequate service loop.

2.2 Align the terminal cap panel with the base enclosure. Next, push in lightly to ensure that the panel is properly seated and install the six screws **(10)** that secure the panel to the bass enclosure.

3. Woofer Removal:

3.1 Remove the terminal cap panel **(9)** as described in Procedure 1.

3.2 Remove the four screws **(5)** that hold the left or right woofer **(4)** in place.

3.3 Lift the woofer out and cut the wires as close to the terminals as possible. The woofer can now be removed from the enclosure.

4. Woofer Replacement:

4.1 Strip the wires and reconnect them to the replacement woofer **(4)** as shown in the schematic (**Figure 1**) and as follows:

A. Left Channel Woofer: Connect the Yellow wire to the positive (+) terminal and the Green wire to the negative (-) terminal.

B. Right Channel Woofer: Connect the Orange wire to the positive (+) terminal and the Brown wire to the negative (-) terminal.

4.2 Align the replacement woofer to the opening and the four screw holes. Make sure the gasket **(6)** is properly seated to ensure an airtight seal and mount the woofer using the four screws **(5)**.

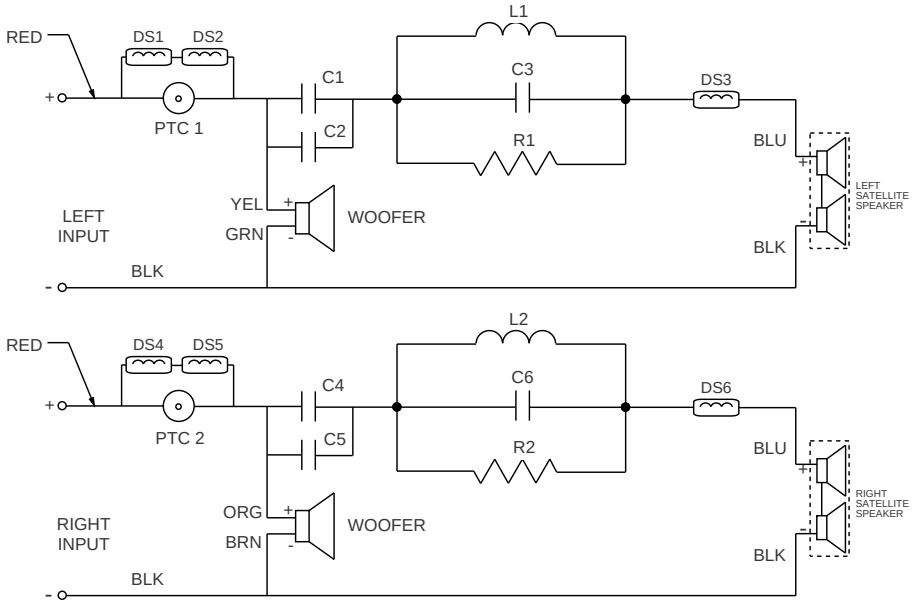

Figure 1: Schematic Diagram

DISASSEMBLY/ASSEMBLY PROCEDURES

5. Crossover Assembly Board Removal - Original Design Only (Per Figure 7A): The crossover assembly board **(7)** is located on the inside of the terminal cap panel.

Note: Trim away all residual glue as necessary when removing individual components from the PC board.

5.1 Remove the terminal cap panel as described in Procedure 1.

5.2 Cut the wires connected to the terminal cup connectors as close to the crossover assembly board as possible.

5.3 Cut the wires connected to the woofer as close to the crossover assembly board as possible.

5.4 Remove the four screws **(12)** and rubber feet **(11)** located on the crossover assembly board that secure the assembly to the panel. The PC board can now be lifted away from the terminal cap panel.

6. Crossover Assembly Board Replacement - Original Design Only:

6.1 After proper alignment, secure the replacement PC board to the terminal cap panel using the four screws and rubber feet.

6.2 Strip the woofer wires and connect them to their respective crossover terminal board pins, Orange to Orange, Brown to Brown etc. as labeled on the PC board.

6.3 Strip the input connector wires and connect them to their respective crossover terminal pins as indicated by the labeling on the PC board.

6.4 Use the excess lead length to recreate a service loop, then attach the terminal cap panel back onto the enclosure using the six screws.

7. Crossover Assembly Board Removal - New Design Only (Per Figures 6 and 7B): The crossover assembly board **(7)** is located on the inside of the terminal cap panel.

Note: Trim away all residual glue as necessary when removing individual components from the PC board.

7.1 Remove the terminal cap panel as described in Procedure 1.

7.2 Remove the two screws **(item 12 on Figure 6)** that secure the assembly to the panel.

Note: The PC Board has eight connector terminals which mate with the four connectors **(item 11 on Figure 6)**.

7.3 Cut the wires connected to the woofer as close to the crossover assembly board as possible. Next, strip the wires and connect to a replacement board.

8. Crossover Assembly Board Replacement - New Design Only:

8.1 Align, then attach the replacement board onto the connector terminals located on the terminal cap panel.

8.2 Secure the crossover assembly board to the terminal cap panel using the two screws.

8.3 Use the excess lead length to recreate a service loop, then attach the terminal cap panel back onto the enclosure.

9. Connector Removal - Original Design Only (Per Figure 5):

9.1 Remove the terminal cap panel as described in Procedure 1.

9.2 Remove the four screws **(12)** that secure the connector **(11)** to the terminal cap panel.

9.3 Separate the connector from the panel, remove the two wires by cutting them as close to the connector pins as possible.

10. Connector Replacement - Original Design:

10.1 Strip the wires and connect them to their respective connector terminal pins, Red to Red and Black to Black.

DISASSEMBLY/ASSEMBLY PROCEDURES

10.2 Align the connector screw holes to the mounting holes on the terminal cap panel and secure the connector using the four screws.

10.3 Reattach the terminal cap panel to the enclosure using the six screws.

11. Connector Removal - New Design Only (Per Figure 6):

11.1 Remove the terminal cap panel as described in Procedure 1.

11.2 Remove the two screws that secure the PC board to the terminal cap assembly, then separate the board from the panel.

11.3 Locate the two pins of the connector **(11)** to be removed that are protruding through the panel. Carefully push on the pins until the connector is released from the panel.

12. Connector Replacement - New Design Only:

12.1 Push the connector carefully through the cutouts in the terminal cap panel.

12.2 Reattach the crossover assembly board to the terminal cap panel.

12.3 Reattach the terminal cap panel to the enclosure using the six screws.

Cube Array Speakers

Note: Refer to **Figure 8** for the following procedures on the satellite speakers.

13. Grille Removal: Remove the grille assembly **(2)** from the enclosure by pulling on all four sides of the grille simultaneously.

14. Grille Replacement: Align the grille frame to the front of the enclosure and press lightly. The grille should attach easily. **Note:** If installing both the top and bottom grille, make sure to use the grille assembly with the Bose® logo on the bottom enclosure.

15. Twiddler™ Removal:

15.1 Remove the grille as described in Procedure 13.

15.2 Remove the four screws **(3)** holding the twiddler **(4)** in place.

15.3 Remove the twiddler from the satellite enclosure and cut the wires as close to the twiddler terminals as possible.

16. Twiddler Replacement:

16.1 Strip the wires and reconnect them to the replacement twiddler **(4)** as follows:

A. Top Twiddler: Connect the Gray wire to the positive (+) twiddler terminal and the Black wire to negative (-) terminal.

B. Bottom Twiddler: Connect the Red wire to the positive (+) twiddler terminal and the Gray wire to negative (-) terminal.

16.2 Lower the twiddler into the satellite enclosure and secure it using the four screws **(3)**.

16.3 Replace the grille, (see Procedure 13).

TEST PROCEDURES

Note: It is important to note that the woofer, crossover network, system and twiddler™ protection network are located in the Acoustimass® module. The satellite speakers are separate and fed from the Acoustimass module. The following procedures will test the complete system as well as each sub-system individually.

The Acoustimass System

Note: Refer to **Figure 2** for the following tests.

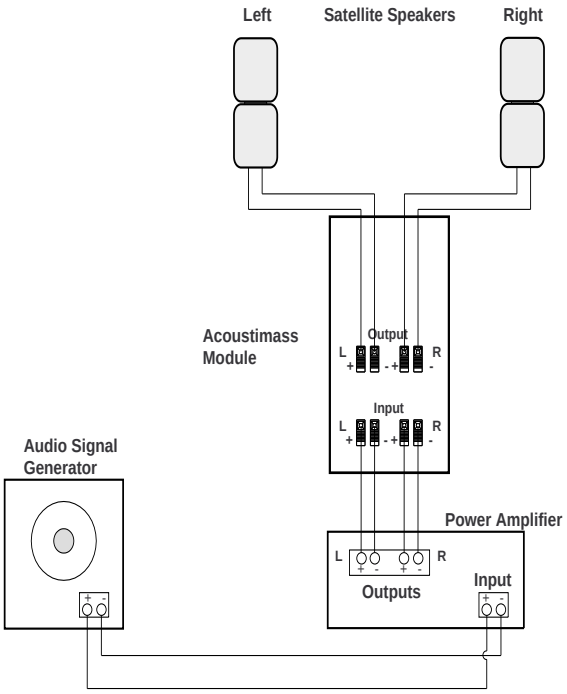

Figure 2: Test Connection Diagram

1. Woofer Rub and Tick Test:

1.1 Connect a sine wave oscillator and power amplifier to the Acoustimass module as shown in **Figure 2**.

1.2 Adjust the frequency of the oscillator to 10 Hz and the amplifier output to 10 Vrms. Connect the amplifier output to the left and right channel input terminals of the Acoustimass module. No extraneous noises such as rubbing, scrapping or ticking should be heard.

Note: To distinguish between normal suspension noise and rubs or ticks, remove the terminal cap panel and displace the cone on each woofer slightly with your fingers. If the noise stays the same, it is normal suspension noise and the woofer is fine. Suspension noise will not be heard with regular program material.

2. Woofer Sweep Test: Connect the amplifier to either the left or the right channel inputs on the Acoustimass module. Then, sweep the oscillator gradually from 10 Hz to 1 kHz using the 10 Vrms signal. There should be no loud extraneous noise. If there are any loud buzzes or distortion, replace the suspect woofer(s).

Note: There should be no buzzes or rattles within the Acoustimass module enclosure. Redress any component or wire that buzzes.

3. Satellite Speaker Sweep Test: Reduce the amplifier output to 5 Vrms and continue sweeping the oscillator from 1 kHz to 15 kHz. Replace any twiddler that buzzes or sounds distorted.

4. Repeat Procedures 2 and 3 for the other channel.

Note: If there is no output from a satellite speaker, check the output of the Acoustimass module output terminals for each channel. The lamp may be open, which would cause no output at the satellite speaker.

5. Air Leak Test: Adjust the oscillator frequency to 45 Hz and the amplifier output to 10 Vrms for a minimum of 5 seconds. Listen for air leaks around each woofer, the terminal cap panel and the cabinet seams. Repair any leaks as necessary.

6. Automatic System Protection Test: To test the protection circuitry, test each channel separately.

TEST PROCEDURES

6.1 Connect the amplifier leads to either the left or right channel inputs of the Acoustimass® module.

6.2 Set the oscillator frequency to 90 Hz and the amplifier output for 30 volts. Connect a voltmeter across the output terminals of the Acoustimass module. **Caution:** Do not apply the signal for more than 60 seconds.

There should be a gradual reduction in the sound level and the voltage should decrease from approximately 8 to 4 Vrms. Repeat this test for the other channel.

7. **Woofer Phase Test:** Adjust the frequency of the oscillator to 45 Hz and the amplifier output to 10 Vrms. Next, disconnect either the left or right input to the base module. The sound output from the base module should decrease.

Note: If the sound output increases, stays the same or stops completely, check for a defective woofer or incorrect wiring of the woofer.

Crossover Testing

Adjust the amplifier output for 2 Vrms and perform the following tests:

8. Adjust the oscillator frequency to 100 Hz and measure the voltage across the input terminals of the left and right satellite speakers. The voltage measured should be 0.56 ±0.12 volts.

9. Re-adjust the oscillator frequency to 2.5 kHz. The voltage measured across the input terminals should be 1.20 ±0.11 volts.

10. Re-adjust the oscillator frequency again to 12 kHz. The voltage measured across the input terminals should be 1.79 ±0.12 volts.

Note: If any of the voltage readings should fall outside of the specified limits, the following items should be checked:

A. Crossover wiring

B. Protection lamps DS6 or DS3 for continuity as well as all other components on the crossover assembly PC board.

C. Make sure all twiddlers™ are operating properly.

Acoustimass Testing (Module Only)

11. **Woofer Rub and Tick Test:** The woofer rub and tick test for the Acoustimass module will be the same as that performed for the entire system (see Procedure 1).

12. **Woofer Sweep Test:** The woofer sweep test for the Acoustimass module will be the same as that performed for the entire system (see Procedure 2).

13. **Air Leak Test:** The woofer air leak test for the Acoustimass module will be the same as that performed for the entire system (see Procedure 5).

14. **Automatic System Protection Test:** To test the protection circuitry, test each channel separately. The automatic system protection test for the Acoustimass module shall be the same as that specified for the system testing except that two 8 ohm, 15 watt resistors shall be used as resistive loads in place of the satellite speakers as shown in **Figure 3**.

TEST PROCEDURES

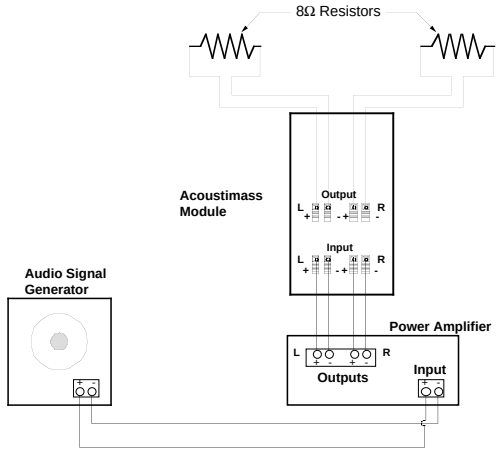

Figure 3: Module Test Diagram

15. Woofer Phase Test: The woofer phase test for the Acoustimass® module will be the same as that performed for the entire system (see Procedure 7).

16. Crossover Testing: The crossover circuit test for the Acoustimass module shall be the same as that specified for the system testing (see Procedures 8, 9 and 10) except that two 8 ohm, 15 watt resistors shall be used as resistive loads in place of the satellite speakers (see **Figure 3**).

Satellite Speaker Test

Note: For the following tests it is recommended that the satellite speakers be tested individually rather than as a paired unit (see **Figure 4**).

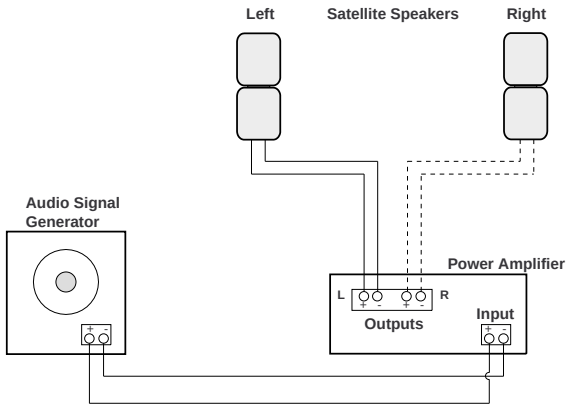

Figure 4: Satellite Speaker Test Diagram

17. Twiddler™ Sweep Test:

17.1 Connect the amplifier directly to either satellite speaker under test (left or right).

17.2 Set the amplifier output to 5 Vrms and sweep the frequency from 1 kHz to 15 kHz. If either of the two twiddlers should buzz or sound distorted, replace it.

17.3 Repeat the above test for the remaining satellite speaker.

18. Twiddler Phase Test:

Caution: For the following test, supply voltage should only be momentarily applied in order to avoid damaging the twiddlers.

18.1 Connect a DC power supply to one of the twiddlers, positive to positive and negative to negative.

18.2 Apply 13 volts to the twiddler. It should move outward with the application of the supply voltage. Repeat this procedure for the other twiddler.

Note: Should either twiddler fail this test, check for loose connections.

Original Design Acoustimass® Box Assembly Parts (Per Figure 5)

Item Number	Description	Part Number	Qty. Per Module	See Note
1	Port Cap :			
	Black or	141384-1	1	
	White	141384-2	1	1
2	Port Flare:			
	Black or	141404-1	1	
	Tru Grit White	141404-2	1	1
3	Screen Port	145325	1	
4	Woofer Assembly, 5.25"	190170	2	Replace in pairs
5	Screw, TAPP, 8-11 x .75, PAN, XRC/SQ	172672-12	8	
6	Gasket, Woofer, 6.5"	104794-08	2	
7	Crossover Assembly	141395	1	1, 2
8	Tape, Gasket, Foam	177321	N/A	
9	Cap Assembly, Terminal:			
	Black or	173311-1	1	
	White	173311-2	1	
10	Screw, TAPP, 8-10 x 1.5 BGL, XRC/SQ	143322-24	6	
11	Connector, Terminal Cup, WW, 2 Pos, Blk	120711	4	
12	Screw, TAPP, 6-13 x .5, PAN, XREC/SQ	172783-08	16	

Notes:
1. This item is not normally a stocked service part.
2. Refer to the appropriate crossover parts list for component part numbers.

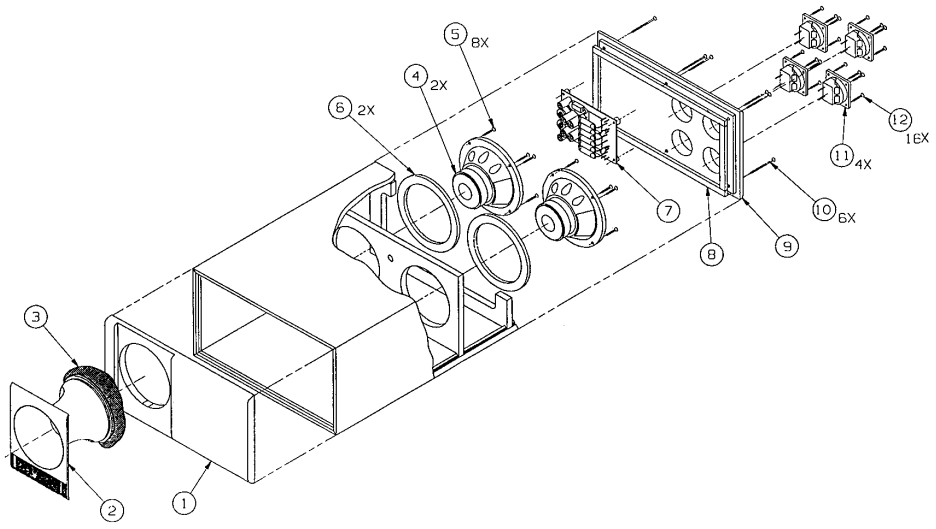

Figure 5: Acoustimass Box Assembly (Original Design)

New Design Acoustimass® Box Assembly Parts (Per Figure 6)

Item Number	Description	Part Number	Qty. Per Module	See Note
1	Port Cap : Black or White	 173310-1 173310-2	 1 1	 1
2	Port Flare: Black or White	 173312-1 173312-2	 1 1	 1
3	Screen Port	145325	1	
4	Woofer Assembly, 5.25"	141393	2	
5	Screw, TAPP, 8-11 x .75, PAN, XRC/SQ	172672-12	8	
6	Gasket, Woofer, 6.5"	104794-08	2	
7	Crossover Assembly:	147944	1	1, 2
8	Gasket, Adh. Backed, Foam	175548	N/A	
9	Cap, Terminal: Black or White	 173311-1 173311-2	 1 1	
10	Screw, TAPP, 8-11 x 1.5, PAN, XRC/SQ	172672-24	6	
11	Connector Barrier, GLTN, 2 Pos, Blk	170036	4	
12	Screw, TAPP, 8-13 x .375, PAN, XRC/S	172783-06	2	

Notes:
1. This item is not normally a stocked service part.
2. Refer to the appropriate crossover parts list for component part numbers.

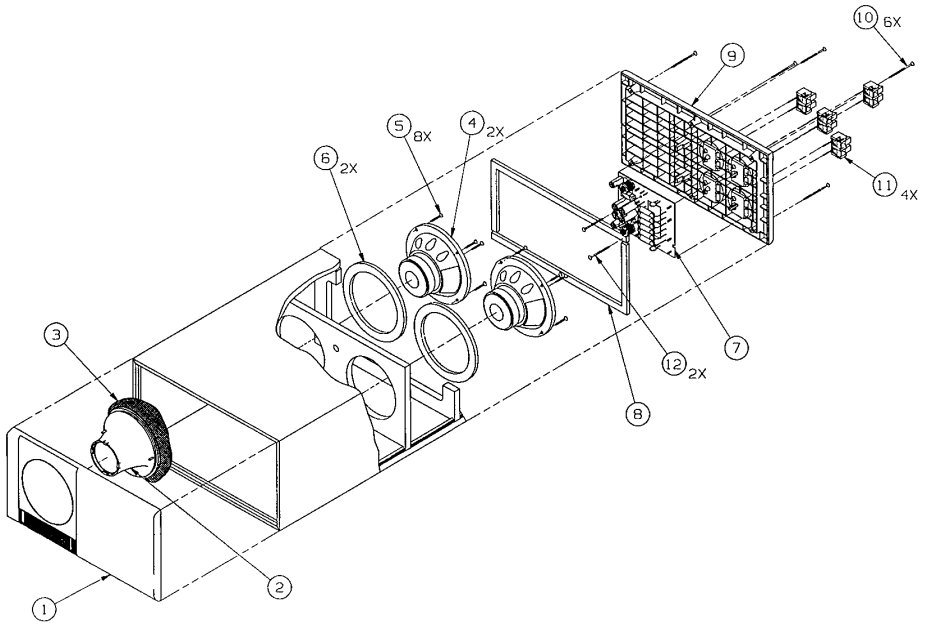

Figure 6: Acoustimass Box Assembly (New Design)

Crossover Parts List, Assembly Part Numbers 141395 & 147944 (Per Figure 7)

Item Number	Description	Part Number	Qty. Per Assy	See Note
1	Inductor, 300uH	131973	2	
2	Capacitor, EL, BP, 85, 50V, 20%, 33 uF	131974	4	
3	Capacitor, EL, BP, 85, 50V, 20%, 15 uF	132079	2	
4	Resistor, WW, 5W, 10%, 5.1 Ohm	132105-5R1	2	
5	Lamp, 2.5A, 24VDC, Mini, Formed	117805	6	
6	Polyswitch, 50V, 4mm	175233-1	2	
7	Screw, Machine, 4-40 x 1, PAN, XREC	103146-16	2	
8	Nut, Hex, 4-40	103234-440	2	
9	Washer, Flat, .141, #5	108258-05	2	
10	Tape, Foil, w/Liner	134636	2	1
11	Foot, .25 x .50, Black	174402-1	4	2
12	Screw, TAPP, 8-11 x .625, PAN, XRC/S	172672-10	4	2

Notes:

1. This item is not normally a stocked service part.

2. Used only on the crossover P.C. Board Assembly number 141395.

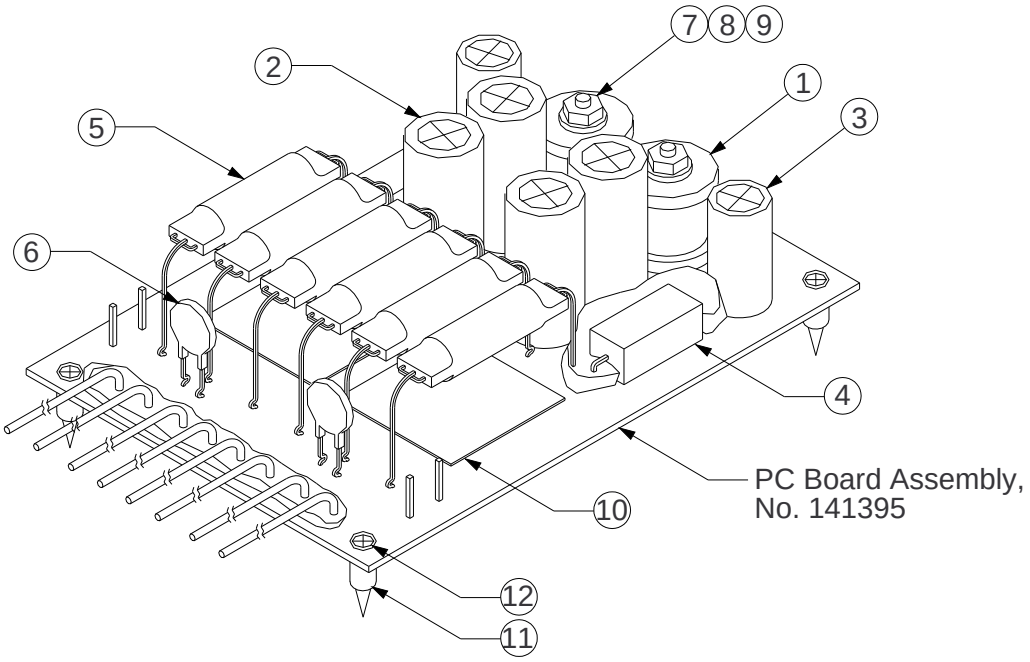

Figure 7A: Original Design

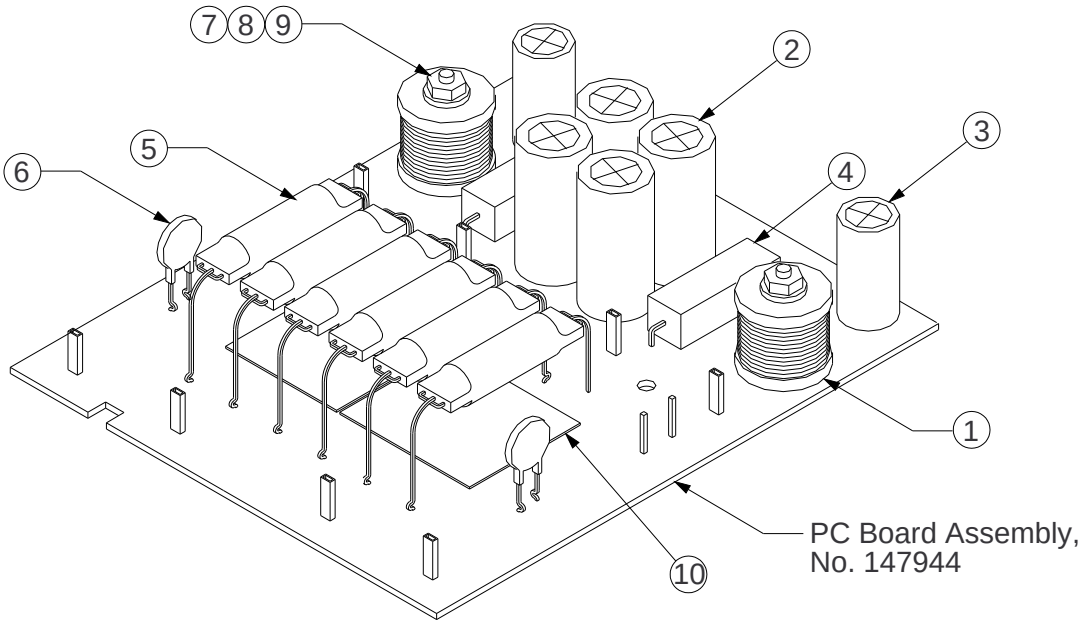

Figure 7B: New Design

Figure 7: AM-5 Series II Crossover Board Assembly

AM-5 Series II Satellite Speaker Assembly Parts List (Per Figure 8)

Item Number	Description	Part Number	Qty. Per Assy.	Reference
1	Nameplate, Logo:			
	Black or	148056-1	2	
	Arctic White	148949-2	2	
2	Grille Assembly, Satellite:			
	Black (North America) or	142185-1	4	
	Arctic White (North America) or	142185-2	4	
	Black (European) or	175177-1	4	
	Arctic White (European)	175177-2	4	
3	Screw, TAPP, 8-11 x .625, PAN,XRC/S	172672-10	16	
4	Twiddler™ Assy, Gasket Backed, 2.25"	184473	4	ECN 20027
5	Batting, Polyester, 12 x 2	116082	8	See Note
6	Conn. Barrier, GLTN, 2 Position, Black	141405	2	

Note: This item is not normally a stocked service part.

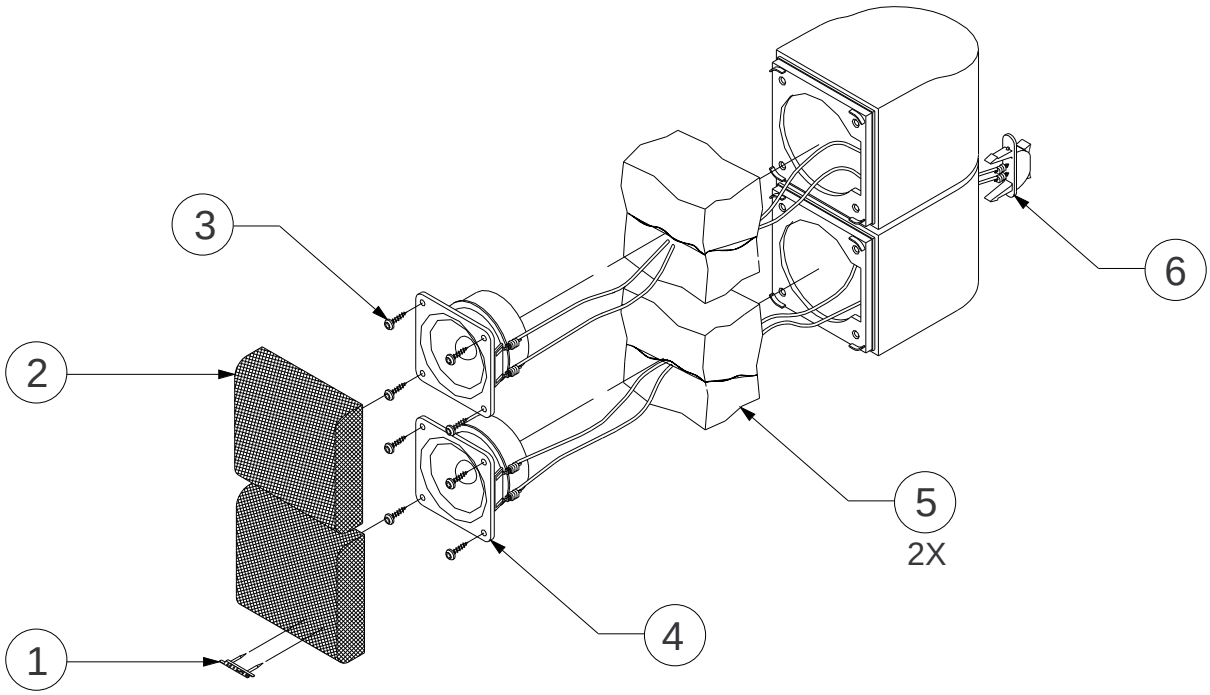

Figure 8: AM-5 Series II Satellite Speaker Assembly

AM-5 Series II Packaging Parts List (See Figure 9)

Item Number	Description	Part Number	Qty. Per Assy	Reference
1	Polybag, 13.5 x 35 x 9.5 x 2.5 mil	114522	1	
2	Packing Corner Post, Bass Module	148044	2	
3	Packing Corner Post, Bass Insert	148364	2	
4	Polybag, 10 x 12 x 2 mil	144677	2	
5	Carton, Satellite Pair Assy, AM-5 II	178982-00	2	
6	Wire, 18/2 Zip Cord, 20 Foot:			
	Black, N. American or	130915	4	
	White, N. American or	140236	4	
	Arctic White, European	135004	4	
7	Packing Tray, D/C, AM-5 II	148362	1	
8	Carton, RSC, AM-5 II, Generic	148359-00	1	
9	Bumper, Recessed Foot, .88"	142839	4	
10	Polybag, 14.38 x 9.87 x 2 mil	103351	1	
11	Owner's Manual, AM-5 II	142218	1	
12	Card, Warranty Information, U.S.	181357	1	
13	Card, Warranty Information, Multi-Lang.	181460	1	
14	Sheet, Declaration of Conformity	184060	1	
15	Brochure, All Products, N. America Only	141478	1	
16	Sheet, Warranty Ser. Stations, N.A. Only	187981	1	

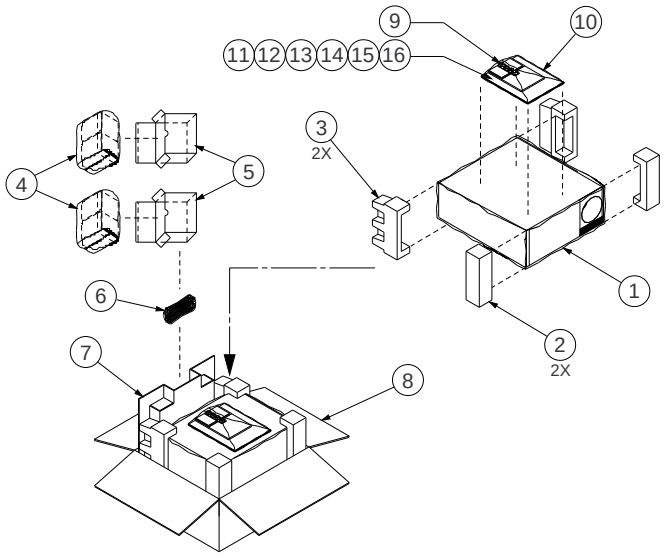

Figure 9: AM- 5 Series II Packaging

SPECIFICATIONS AND FEATURES SUBJECT TO CHANGE WITHOUT NOTICE

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P/N 144375 9/96 REV. 03 FOR TECHNICAL ASSISTANCE AND PARTS ORDERING, CALL 1-800-367-4008

Rev 02 to Rev 03; add replacement woofer part number

AM-5® Speaker System

172113

Protection Lamps

NOTE: Please replace original AM-5-1 service bulletin with this revision. "RT-1R" was incorrectly identified as "RT-2L" on the original bulletin.

It has come to our attention that protection lamps (**RT-1L,RT-1R**) are failing when the AM-5 system is used in high power applications. This applies only to the original AM-5 and not the current series II.

To remedy this situation, **RT-1L** and **RT-1R** can be replaced by two protection lamps connected in series. Use the following procedure and refer to pages 6-8 of the AM-5 service manual, part # 138197.

1. To access the Crossover PCB, refer to step 1 of the Disassembly Procedure on page 6 of the service manual.

2. Desolder the leads of the original protection lamps (**RT-1L** and **RT-1R**) and remove them from the PCB.

3. Take 2 new protection lamps (**P/N 117805**) and twist one pair of leads together. Trim the ends off the twisted pair. See **Figure 1** below.

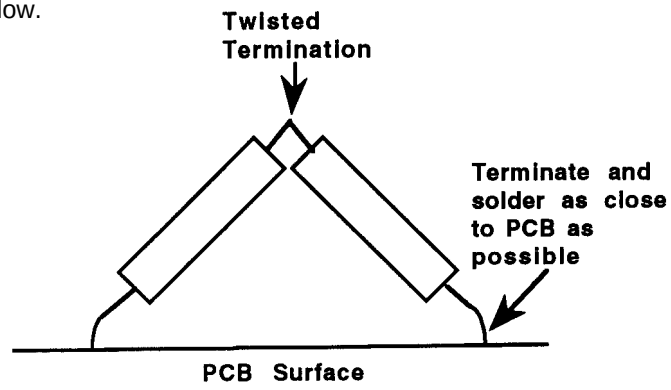


Figure 1

4. Solder a pair of replacement lamps into the original PCB locations of **RT-1L** and **RT-1R**. The lamps should be soldered as close to the PCB surface as possible. **Make sure that the lamps do not touch any other component or connection.**

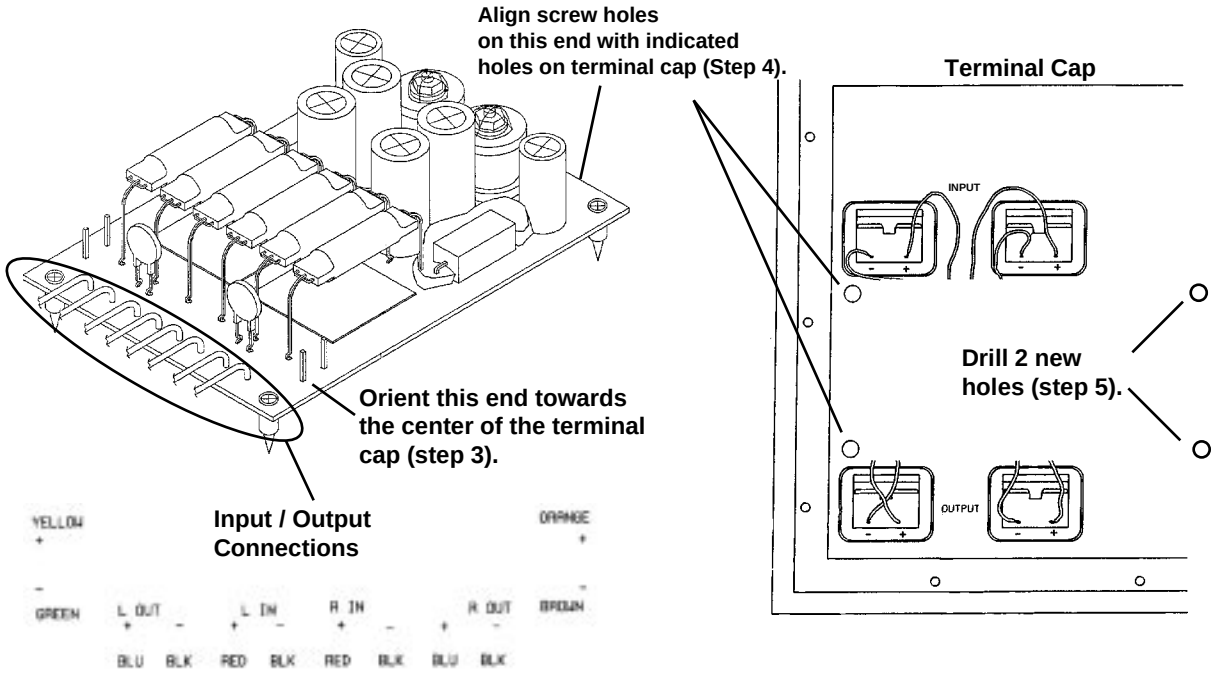
5. Make sure that the new protection lamps do not rattle when an audio signal is applied. Repeat any test procedures needed to check out the Crossover PCB and protection circuitry.

AM-5® Speaker System 176552

Crossover Replacement

The original AM-5 Crossover PCB **(P/N 130487)** is no longer available. Replace it with the AM-5 II Crossover PCB **(P/N 141395)**.

Figure 1



1. Remove the terminal cap.

2. Remove the original PCB.

NOTE: The new PCB is longer than the old one. 2 new mounting holes are needed (refer to step 5).

3. Orient the PCB as shown in Figure 1.

4. Align the screw holes (see Figure 1).

5. Estimate a drilling location and drill 2 new holes (see Figure 1).

6. Secure the PCB to the terminal cap with 4 screws.

7. Re-install the terminal cap.

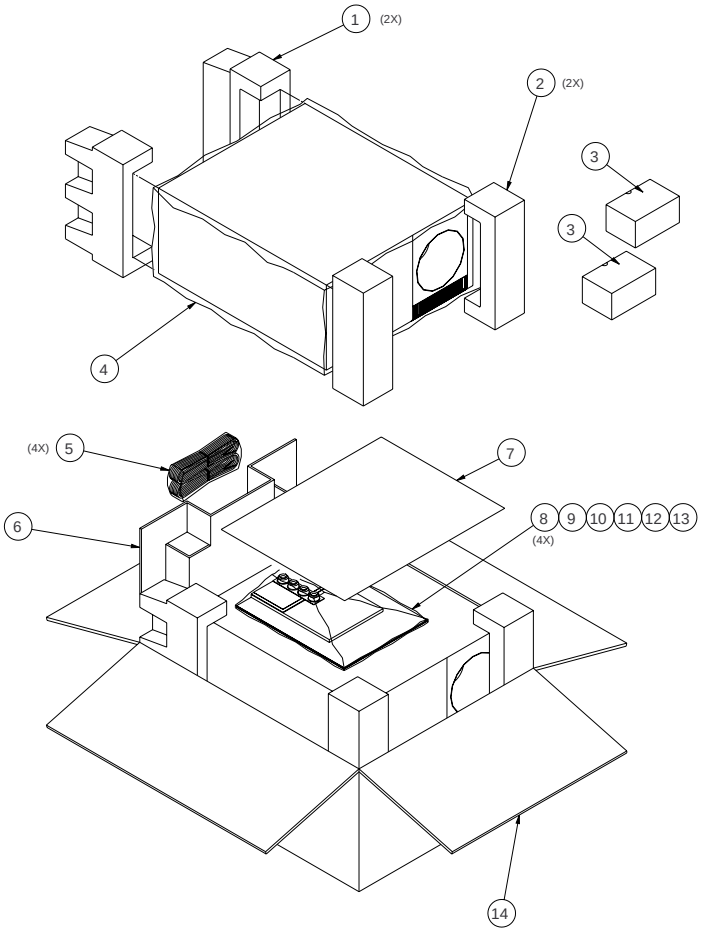
SUPPLEMENT

Better sound through research®

Acoustimass® 5 Series III Loudspeaker System

The following parts listed in the Acoustimass 5 Series III service manual, part number 198662, have changed. Please make a note of this change in your service manual for future reference.

Item Number	Description	Old Part Number	New Part Number	Qty.
3	SATELLITE ASSY, SGL, BLK	192420-019	192420-119	2
3	SATELLITE ASSY, SGL, WHT	192420-029	192420-129	2



ECN: 25969
Date Issued: 4/99

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AM5 II 144375-B1

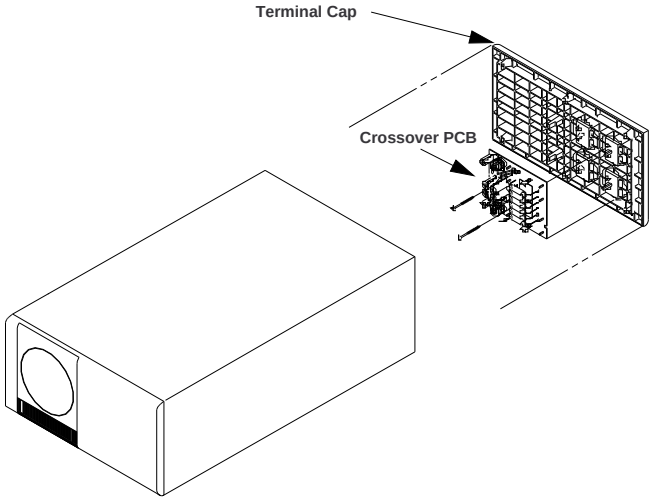
Bosses breaking on the terminal cap.

Symptom: The customer complains of no or intermittent output.

Reason: The bosses that are used to secure the crossover PCB to the terminal cup might be broken.

Solution: Replace the terminal cap (173311-1, black) (173311-2, white).

The bosses located on the terminal cap that are used to secure the crossover PCB can break. If this happens, the crossover PCB can develop an intermittent connection to the terminal cap. If a customer complains of no or intermittent output, check the terminal cap for broken bosses. If this problem is found, replace the terminal cap (173311-1, black) (173311-2, white). The problem has been solved by improvements in the bosses on later production terminal caps. See the AM5 II service manual, 144375, for disassembly instructions.



Date Issued: 7/16/97

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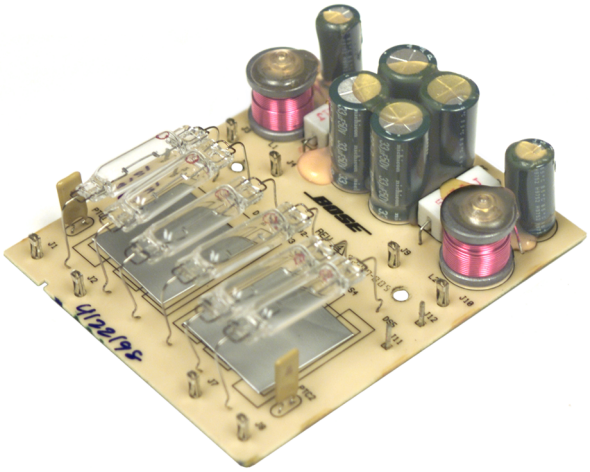
SUPPLEMENT

AM-5® Series II Acoustimass® Speaker System

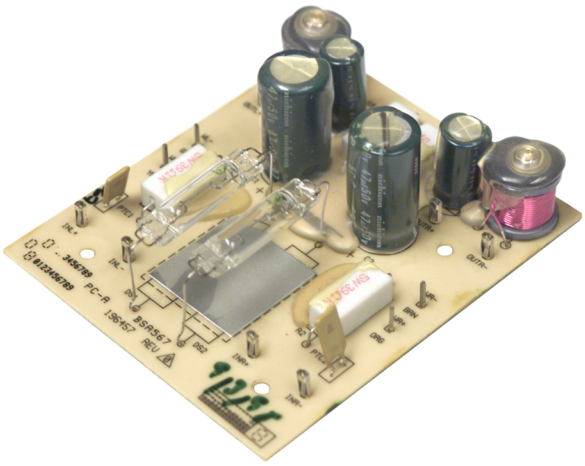
The crossover assembly part number 147944 is no longer available. If the crossover assembly needs to be replaced use part number 196456 as the replacement.

Please make a note in your AM-5 Series II service manual part number 144375.

Refer to the figures on the back of this supplement for the correct placement of the crossover assemblies.



Original PCB, Part Number 147944



Replacement PCB, Part Number 196456

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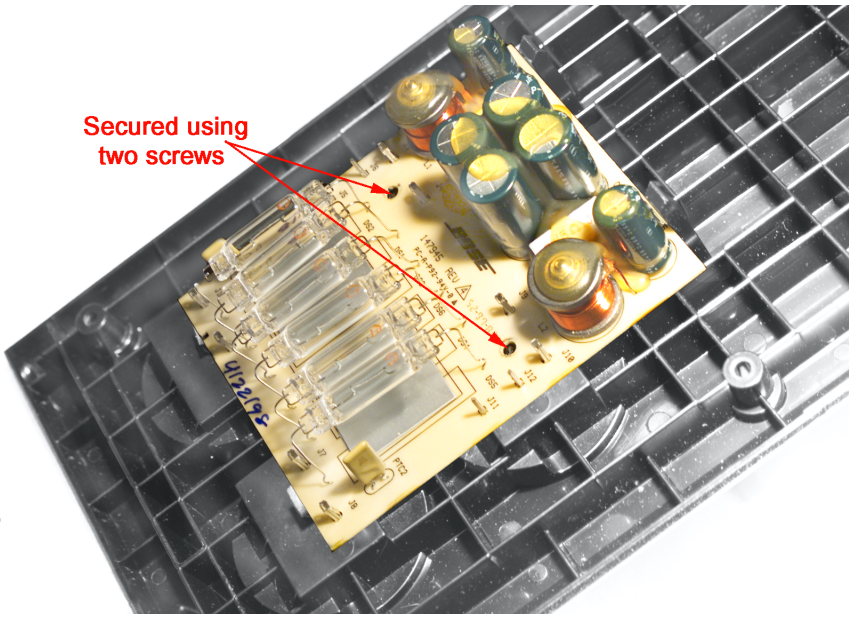


Figure 1. PCB Part Number 147944

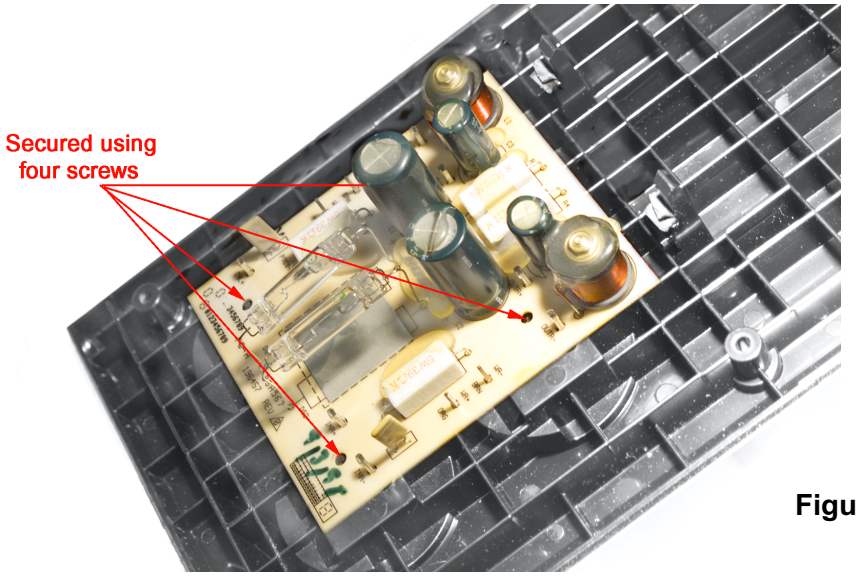
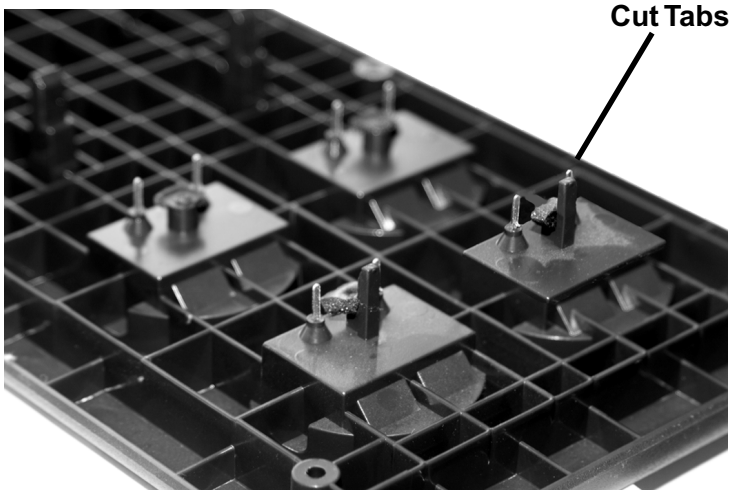
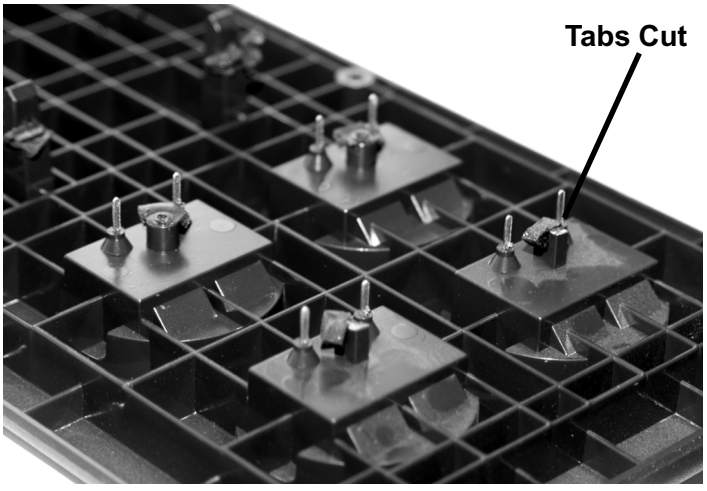


Figure 2. PCB Part Number 196456





On some of the older panel assemblies, the locating tabs must be cut so the new PCB will mount onto the speaker connectors. With this type of back panel there are only two screws used to secure the PCB.